

### ABSTRACT

An exhaust gas flow circuit includes a pumping unit having an inlet communicating with the exhaust system, and an exhaust outlet, for pumping exhaust gas from the exhaust system to the exhaust outlet. A bypass passage is arranged in parallel  
5 flow relation with the pumping unit between the inlet and outlet. When the mass flow rate of exhaust gas is relatively high, a bypass valve opens the bypass passage providing a flow path for exhaust gas between the inlet and outlet in parallel with the pumping unit. When the mass flow rate of exhaust gas is relatively low, the bypass valve closes the bypass passage. The bypass valve can be controlled to open and close in response to  
10 engine speed or mass flow rate of exhaust gas, for example.

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